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Operation and Maintenance Plan for INTEC Operable Unit 3-13, Group 1, Tank Farm Interim Action, Phases I and II



Idaho National Engineering and Environmental Laboratory

**Operation and Maintenance Plan for INTEC
Operable Unit 3-13, Group 1, Tank Farm Interim
Action, Phases I and II**

September 2004

**Prepared for the
U.S. Department of Energy
Idaho Operations Office**

ABSTRACT

This Operation and Maintenance Plan describes the activities and procedures required to inspect, monitor, and maintain the items implemented during performance of the Waste Area Group 3, Operable Unit 3-13, Group 1, Tank Farm Interim Action, Phases I and II at the Idaho Nuclear Technology and Engineering Center. This plan addresses surveillance and monitoring activities for the surface sealing on specified tank farm areas, concrete-lined ditches and culverts in and around the tank farm, a lift station, and a lined evaporation pond. These activities are intended to ensure that the interim action is functioning adequately to meet the objectives stated in the Operable Unit 3-13, Record of Decision for the Group 1, Tank Farm Interim Action and as amended by the Agreement to Resolve Dispute, which was issued in March 2003.

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DEQ	Idaho Department of Environmental Quality
DOE	Department of Energy
DOE-Idaho	Department of Energy Idaho Operations Office
EPA	Environmental Protection Agency
FFA/CO	Federal Facility Agreement and Consent Order
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
O&M	operation and maintenance
OU	operable unit
RA	remedial action
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
TFIA	Tank Farm Interim Action
WAG	waste area group

Operation and Maintenance Plan for INTEC Operable Unit 3-13, Group 1, Tank Farm Interim Action, Phases I and II

1. INTRODUCTION

This site-specific Operation and Maintenance (O&M) Plan describes the activities and procedures required to inspect, monitor, and maintain the items that have been and will be installed during performance of the Waste Area Group (WAG) 3, Operable Unit (OU) 3-13, Group 1, Tank Farm Interim Action (TFIA), Phases I and II, at the Idaho Nuclear Technology and Engineering Center (INTEC). These items include the following:

- Asphalt barrier over Sites CPP-28, -31, and -79 and associated drainage system
- Asphalt coverings installed over selected areas within 150 ft of the tank farm
- Concrete-lined ditches and culverts in and around the tank farm
- Lift station
- Evaporation pond liner system and equipment.

The concrete-lined ditches and culverts are designed to receive and transport storm water runoff from the tank farm and surrounding area to the evaporation pond. In addition, as stated in Section 11.1.1 of the OU 3-13 Record of Decision (ROD) (DOE-ID 1999), the evaporation pond was "...constructed and used as a best management practice to reduce infiltration in the INTEC area." In light of this best management practice, waters have been identified that could contribute to the transport of contaminants to the perched water. Where possible, these waters will be diverted to the evaporation pond in lieu of being discharged to the ground and potentially contributing to the perched water in the proximity of the tank farm. Examples of waters that will be diverted to the evaporation pond include

- Storm water from precipitation events or water from potable, demineralized, or fire water line breaks/discharges that has collected in utility tunnels. Before the first transfer of this water to the TFIA drainage system, a one-time sampling of the utility tunnel waters will be performed. This water will be sampled and assessed for chemical constituents (volatile organic compounds, semivolatile organic compounds, and total metals) and radionuclides to provide information for a waste determination. If additional utility tunnels are identified that have collected water, this action will be performed for each new tunnel/discharge prior to the initial discharge.
- Plant waters that have not come into contact with radiologically controlled systems or hazardous waste. These include raw water, fire water, potable water, and demineralized water.

Surveillance and monitoring tasks will commence after the remediation activities are completed and are anticipated to continue until the final remedy for OU 3-14 is completed. The OU 3-13 Record of Decision (ROD) (DOE-ID 1999) deferred a final remedy for Group 1 to a separate ROD that is designated OU 3-14. This deferment was based on the limited information available and the need to gather additional information to select a final remedy. The OU 3-14 ROD for the tank farm will be prepared following further investigations and the development of the OU 3-14 Remedial Investigation/Feasibility Study (RI/FS). Surveillance and monitoring are intended to assure adequacy of

the interim action stated in the OU 3-13 ROD and as altered by the Agreement to Resolve Dispute (Bowhan 2003). The interim actions included the following:

- Restricting access to control exposure to workers and prevent exposure to the public from soils at the tank farm until implementation of the final remedy under OU 3-14
- Accommodating a 1 in 25-year, 24-hour storm event with surface water run-on diversion channels
- Minimizing precipitation infiltration over the release Sites CPP-28, CPP-31, and CPP-79 by placing an infiltration barrier over these sites sufficient to divert 80% of the average annual precipitation from the selected release sites.

The activities encompassed by this plan include routine inspections and radiological surveys of the TFIA selected asphalt covers, drainage systems, and lift station, as well as monitoring the evaporation pond, liner integrity, and equipment performance. Standard O&M procedures will be integrated into the INTEC documentation to provide proper maintenance during and after future operations or construction activities within the TFIA area.

This O&M Plan will be revised and updated as pertinent information is received from the equipment/material manufacturers. Upon receipt of suggested O&M information from manufacturers, repair manuals, etc., this plan will be finalized and submitted with the Remedial Action (RA) Report.

2. BACKGROUND

The INTEC, formerly known as the Idaho Chemical Processing Plant, is located in the south-central area of the Idaho National Engineering and Environmental Laboratory (INEEL) in southeastern Idaho (see Figure 2-1). From 1952 to 1992, operations at INTEC primarily involved reprocessing spent nuclear fuel from defense projects, which entailed extracting reusable uranium from the spent fuels. Liquid waste generated from the reprocessing activities, which ceased in 1992, is stored in an underground tank farm at INTEC. Both soil and groundwater contamination resulted from these previous operations. Under the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991), the Environmental Protection Agency (EPA), Idaho Department of Environmental Quality (DEQ), and Department of Energy (DOE) are directing cleanup activities to reduce human health and environmental risks to acceptable levels.

Several phases of investigation have been performed at the OUs within WAG 3. A comprehensive RI/FS (DOE-ID 1997a, 1997b, 1998) was conducted for OU 3-13 to determine the nature and extent of contamination and corresponding potential risks to human health and the environment under various exposure pathways and scenarios. Based on the RI/FS results, INTEC release sites were further segregated into seven groups by contaminants of concern, accessibility, or geographic proximity to allow development and analysis of RA alternatives. The TFIA was designated as Group 1 within OU 3-13. The Group 1 soils are within the tank farm fence; however, the TFIA also includes an approximate 150-ft perimeter area (Figure 2-2). There are several buildings surrounding the tank farm; therefore, the perimeter boundary line is not necessarily drawn uniformly at the 150-ft mark. The area within the fence is approximately 200,000 ft² (4.6 acres) and the area within the 150-ft zone (outside the fence) is approximately 160,000 ft² (3.7 acres). The principal threats posed by the Group 1 soils are from direct radiation exposure to workers or the public and from the potential leaching and transport of soil contaminants to the perched water or the Snake River Plain Aquifer.

In order to meet the intent of the TFIA in the OU 3-13 ROD as altered in the Agreement to Resolve Dispute (Bowhan 2003), the following interim action activities are completed or are planned for the Group 1 soils:

- Selected storm water collection ditches around the tank farm and out to the discharge point will be graded and lined with concrete.
- Selected culverts around the tank farm and out to the discharge point will be replaced with larger culverts to accommodate the expected increase in storm water flow.
- A lift station has been constructed at the intersection of Beech and Olive Avenue to pump storm water to a location where it will drain freely to the discharge point.
- Concrete headwalls and endwalls will be constructed as necessary throughout the lined drainage system.
- A double-lined evaporation pond will be constructed to collect storm water run-off from the tank farm and other INTEC areas that currently drain into Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site CPP-37A. The pond will be located south of CPP-37A and north of Building CPP-698.

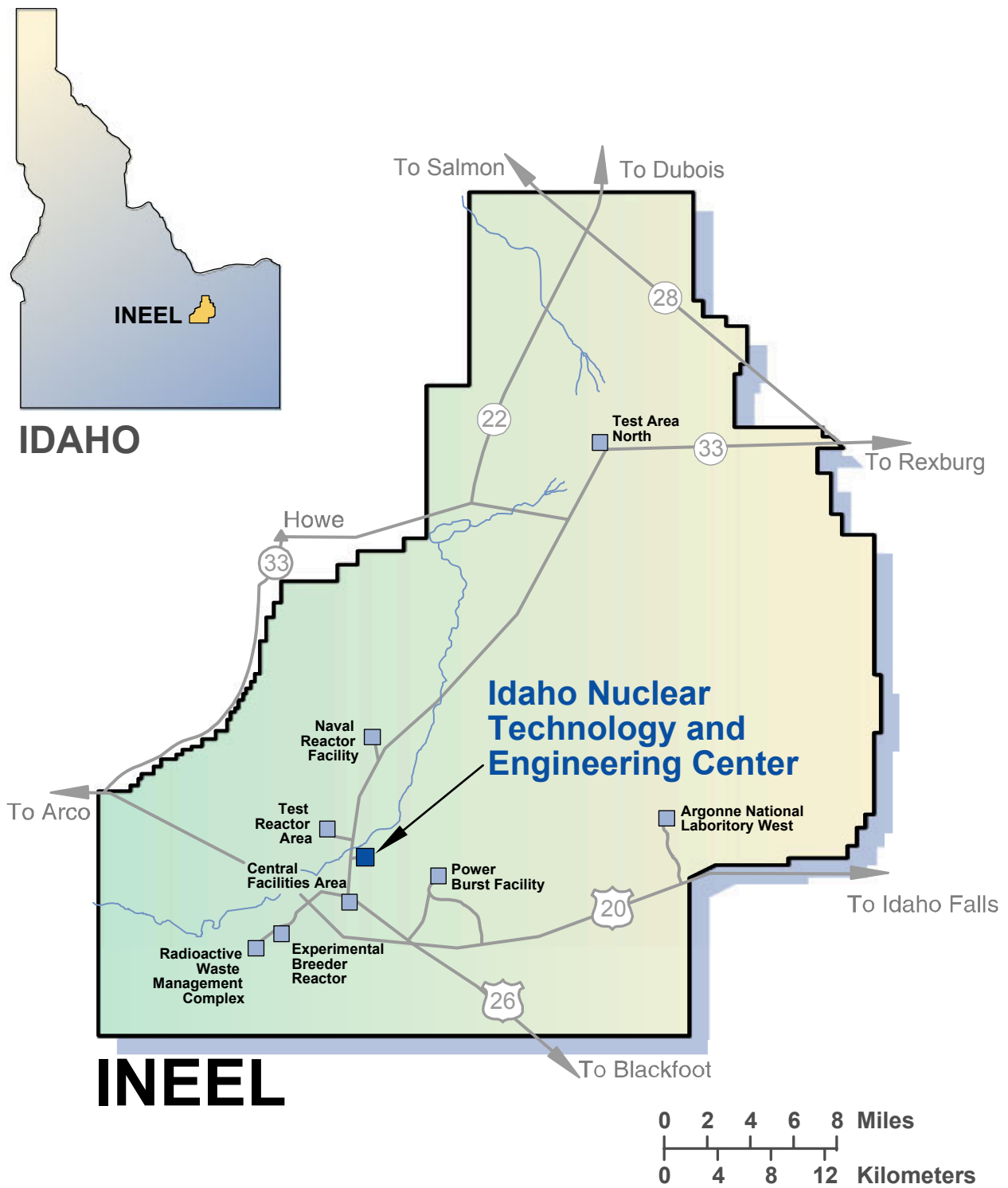


Figure 2-1. Location of INTEC at the INEEL.

- A new fence will be constructed around the evaporation pond.
- Site areas, located inside the tank farm, CPP-28, -31, and -79 (Figure 2-2) will be covered with an infiltration barrier and a surface water diversion system shall be installed to create positive drainage toward the storm water collection system.
- Asphalt coverings will be installed over selected areas in the 150-ft control zone around the tank farm.

3. INSPECTION, MONITORING, AND MAINTENANCE

Inspection, monitoring, and maintenance activities are required for asphalt-paved areas, the storm water collection system (including the lift station), and the evaporation pond. The inspections of these items and sites are further divided into three types: (1) scheduled inspections, (2) followup inspections, and (3) contingency inspections. Scheduled inspections are summarized in Table 3-1. Followup inspections after repair or replacement activities will occur as determined by the Group 1 contractor project manager. Contingency inspections are unscheduled, situation-unique inspections, ordered by the Department of Energy Idaho Operations Office (DOE-Idaho) when it has information that indicates the site integrity has been or may be threatened. Events that might trigger contingency inspections include severe rainstorms, floods, or highly unusual events such as tornadoes or earthquakes. The reporting requirements for inspections and maintenance activities are discussed in Section 4, Reporting. This inspection and maintenance section will be revised after completing the Phase I and II activities in order to include specific details that will allow an inspector to determine the degree of acceptability of component conditions.

3.1 Surface-Sealed Areas

All surface-sealed areas will be inspected for cracks and potholes having the potential to compromise the integrity of the infiltration barrier (or interfering with the proper run-off and drainage). The frequency of inspections will be based upon the location of the surface-sealed areas as described below. However, if concerns are noted, the inspections may occur more frequently. Inspections will not be conducted when snow is on the ground (i.e., snow removal will not be conducted to inspect the surface underneath). The asphalt will be monitored for radiological conditions in accordance with INEEL radiological monitoring and control policies, which incorporate the requirements of 10 CFR 835.401 and 10 CFR 835.1102. The INEEL radiological control personnel monitor areas at INTEC to (a) document radiological conditions, (b) detect changes in radiological conditions, including the gradual buildup of radioactive material, (c) verify the effectiveness of engineering and process controls in containing radioactive material and reducing radiation exposure, (d) maintain appropriate controls and restrictions to prevent the inadvertent transfer of contamination to locations outside of radiological areas, and (e) identify and control potential sources of individual exposure to radiation and/or radioactive material.

Filters located at the drainpipes for each surface-sealed area will be inspected to verify they are in-place, not obstructed by any debris, and replaced as recommended by manufacturer. The information obtained during these inspections, along with any recommended corrective actions, will be recorded on an inspection report form as shown in Appendix A. The inspection report forms will be maintained in a project logbook. Photographs may be taken during the inspection and included with the inspection report form.

For areas outside the tank farm fence, inspections will be conducted quarterly after installation. Noted cracks, potholes, etc., will be repaired as part of a coordinated effort with INTEC facility asphalt maintenance activities.

For areas inside the tank farm fence, inspections will be conducted monthly for the first 6 months after installation and quarterly thereafter. Noted cracks and potholes will be repaired expeditiously. The work control process to perform the repair will be initiated immediately, using, where possible, an existing work control for "routine maintenance" to expedite the repair. Cracks will be repaired approximately 30 days after discovery (repair timeframe will not exceed 60 days). Repairs will use commercially available asphalt repair materials (e.g., asphalt chuck filler and asphalt crack filler). As needed, temporary repairs will be conducted and maintained until final repairs can be performed in coordination with INTEC facility asphalt maintenance activities.

Table 3-1. Inspection, monitoring, and maintenance requirements for the TFIA.

Item	Requirement	Action
Surface-sealed areas	Periodic inspection and maintenance following installation and upgrades to ensure integrity, monitor radiological conditions, and verify drainage to the storm water collection system.	Inspection and maintenance inside the tank farm will be performed monthly for the first 6 months following installation and quarterly thereafter, and quarterly following installation for areas outside the tank farm unless concerns are noted that may require more frequent inspections. Radiological surveys of these areas will be performed at a specified frequency, in accordance with 10 CFR 835.401, 10 CFR 835.1102, and local procedures.
Storm water collection system	Periodic inspection and maintenance following installation/upgrades to ensure integrity of the system, to ensure drainage from the tank farm and other INTEC areas to the evaporation pond, and to monitor for radiological conditions.	Inspections and maintenance will be performed semiannually (April and October). Radiological surveys will be performed following precipitation events causing run-off. Radiological surveys will be performed at a specified frequency, in accordance with 10 CFR 835.401, 10 CFR 835.1102, and local procedures.
Lift station	Periodic inspection and maintenance of the pumps and controls following installation of the lift station to ensure proper equipment operation.	Inspection and maintenance activities will be performed per the INTEC facility procedures and schedule for lift stations inspection and maintenance. Copies of the Facility Inspection Report Forms for the lift station will be maintained in the project files.
Evaporation pond liner and perimeter	Periodic inspection and maintenance of the evaporation pond liner and associated area to ensure that the liner is not leaking and that the pond is performing as designed.	Inspection and maintenance of the liner and perimeter, including the fence, will be performed monthly.
Evaporation pond leak detection system	Periodic inspection and maintenance of the leak detection system to ensure it is functioning properly.	Inspection and maintenance of the leak detection system will be performed monthly for the first 6 months and quarterly thereafter.
Sediment inspections and removal	Periodic inspections of the pond inlet and outlet for sediment debris accumulation to ensure that flow is not impeded.	Inspections of the pond inlet and outlet will be performed monthly and, as necessary, sediment will be removed in accordance with a plan that will be developed.

3.2 Storm Water Collection System

All ditches and culverts associated with the storm water collection system will be inspected semiannually and following installation and upgrade activities. The inspection will entail walking entirely around and visually inspecting these areas (see Figure 2-2) to ensure that (a) the ditches, culverts, and discharge areas are free of debris and ice that could prohibit run-off to the evaporation pond and (b) the integrity of the concrete is not compromised by fully penetrating cracks. Radiological surveys will also be conducted on the ditches and culverts to monitor for radiological conditions. In addition to the above inspection and monitoring schedule, radiological surveys will be performed on ditches and culverts following precipitation events causing surface water run-off. The information obtained during each inspection, along with any recommended corrective actions, will be recorded on an inspection report form as shown in Appendix A. The inspection report form will be maintained in a project logbook. Photographs may be taken during the inspections and included with the inspection forms.

3.3 Lift Station

The lift station will undergo periodic inspection and maintenance of the pumps and controls following installation and upgrade activities to ensure proper equipment operation. The inspections will occur monthly for 6 months of system operation, then on a quarterly basis thereafter (January-March, April-June, July-September, October-December). Maintenance will be performed in accordance with the specifications as provided in the vendor data for the equipment.

3.4 Evaporation Pond

The evaporation pond inspections will consist of visual inspections of the liner and all perimeter areas. Inspections will also be conducted to evaluate the performance of the leak detection system. Additionally, inspections for sediment buildup will be conducted when the pond is empty or the depth of water in the pond is low. A more detailed description of the inspections is provided in the following sections. The Engineering Design File describing the evaporation pond sizing design is included in Appendix C of the RD/RA Work Plan (DOE-ID 2003).

3.4.1 Evaporation Pond Liner and Perimeter Areas

The liner at the perimeter of the pond will be visually inspected on a monthly basis for rips and tears, evidence of animal intrusion, weed growth (through the liner or around the perimeter), environmental degradation, and failure of the liner anchoring system (i.e., the liner pulling away from the pond edges). The perimeter fence and the pond inlet (when visible) and outlets will also be inspected monthly to ensure they are in good repair and that these areas are free of debris. Photographs may be taken during the inspection and included with the inspection report form, shown in Appendix A. The inspection report forms will be maintained in a project logbook.

3.4.2 Evaporation Pond Leak Detection System

The leak detection system will be inspected monthly for the first 6 months and quarterly thereafter. These are 2-day inspections and must be performed when the pond is not frozen to ensure that the pumps and controls are working as designed and to ensure that the primary liner is not leaking more than the maximum allowable leak rate for this pond, which is 1/8-in. per acre per day (3,400 gal/acre/day).

On the first day, the pump, piping, and control switches will be checked to ensure they are in proper working condition per the manufacturers' specifications. The time of day, volume of water

recorded on the totalizer, and depth of water in the pond will also be noted on the inspection form. The following day, at approximately the same time, the volume of water recorded on the totalizer will be noted. The previous day's volume will be subtracted from the current volume to obtain the daily leakage volume. The daily leakage volume will then be divided by the estimated water surface area to obtain the leak rate in gal/acre/day. The calculated leak rate will then be noted on the inspection form. If this volume is greater than 3,400 gal/acre/day, a corrective action schedule will be developed and the leak(s) will be located and repaired per the liner manufacturer's specifications.

3.4.3 Sediment Inspections and Removal

Monthly inspections of the pond inlet, outlet, and all associated drainage ditches/pipes/culverts will be conducted for sediment and debris accumulation. If sediments appear to be impeding flow into the pond or potential flow from the pond, maintenance actions will be scheduled for cleaning these areas as soon as possible. Sediment removal activities will be conducted on an as-needed basis depending upon the inspections as discussed below.

The evaporation pond is expected to be drained every 8 to 10 years on average. However, if significant leaks are detected in the liner or sediment appears to be blocking the influent pipe, the water in the pond will be pumped out as necessary for maintenance. Prior to pumping, an evaporation pond cleanout plan will be developed and implemented to ensure compliant removal and management of the water and sediment. There are no outlets at an elevation deep enough to empty the pond; therefore, temporary pumps will be used to drain the pond when required. During pond drainage, the flow rates from the pumps will be monitored to ensure that the outflow is not eroding the ditch banks in the small ditch carrying the flow from the pond.

If the pond is being drained for liner maintenance or excessive storm water volumes, the sediment in the pond will be evaluated and removed if necessary as preventative maintenance. Prior to cleaning out the sediment, a plan will be developed which will include sediment sampling, analysis, and removal by a pumping or vacuum system. Upon completion of sediment sampling and analysis, a waste determination will be performed and documented on a Waste Determination and Disposition Form. If only minor volumes of sediment are found, it will be noted on the inspection report form and sampling or removal activities will not be conducted. Photographs may be taken during the inspection and included with the inspection report form, shown in Appendix A. The inspection report forms will be maintained in a project logbook.

4. REPORTING

An O&M report will be submitted to the EPA, DEQ, and DOE-Idaho on an annual basis until the OU 3-14 ROD is signed, which will provide further direction. The report may include the following:

- A summary of the inspections performed
- A summary of sediment sampling and analysis results as required
- A summary of maintenance activities performed to date
- A summary of the evaporation pond monitoring data
- An estimate of maintenance activities required for the next year
- A copy of completed inspection forms
- Copies of available photographs of pertinent items, such as significant repairs performed during the year.

5. RESPONSIBILITIES

The individuals responsible for inspections, repairs, reporting, and notifications required for the Group 1, TFIA are specified below.

5.1 DOE-Idaho Project Manager

The DOE-Idaho, OU 3-13, remediation project manager is responsible for ensuring that the TFIA O&M activities are performed in accordance with the approved O&M plan, coordinating the activities of the INEEL operating contractor at WAG 3, OU 3-13, Group 1, and reviewing and approving the O&M report.

5.2 OU 3-13, Group 1, Contractor Project Manager

The Group 1 contractor project manager is the point of contact for all O&M activities and is responsible for the following:

- Implementing inspections by using personnel familiar with the system as constructed and operated
- Implementing and coordinating of maintenance activities
- Administrating subcontracts for performing required maintenance activities
- Submitting of O&M reports to DOE-Idaho, EPA, and DEQ
- Ensuring document control of O&M reports, including their placement in the project files and the CERCLA record files, as necessary.

5.3 WAG 3 Project Engineer (or Designee) or the Site Operations Manager

The WAG 3 project engineer (or designee) or the site operations manager shall take direction from the OU 3-13, Group 1, contractor project manager and is responsible for the following:

- The paperwork and reporting of the necessary inspections
- Recordkeeping that is required by this O&M Plan.

6. REFERENCES

- 10 CFR 835.401, 2004, "General requirements," *Code of Federal Regulations*, Office of the Federal Register, January 2004. (as promulgated as of October 1999)
- 10 CFR 835.1102, 2004, "Control of areas," *Code of Federal Regulations*, Office of the Federal Register, January 2004. (as promulgated as of October 1999)
- Bowhan, 2003, Letter From Brett B. Bowhan to Darrel G. Early and Cyndy Mackey, "Final Original Copy of Agreement to Resolve Dispute Waste Area Group 3, Operable Unit 3-13," OCC-03-025, March 4, 2003.
- DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, Department of Energy Idaho Field Office, Environmental Protection Agency Region 10, State of Idaho Department of Health & Welfare, December 1991.
- DOE-ID, 1997a, *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL, Part A, RI/BRA Report (Final)*, DOE/ID-10534, Rev. 0, U.S. Department of Energy Idaho Operations Office, November 1997.
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- DOE-ID, 1998, *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL—Part B, FS Supplement Report*, DOE/ID-10619, Rev. 2, U.S. Department of Energy Idaho Operations Office, October 1998.
- DOE-ID, 1999, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Rev. 0, U.S. Department of Energy Idaho Operations Office, October 1999.
- DOE-ID, 2003, *Remedial Design/Remedial Action Work Plan for Group 1, Tank Farm Interim Action*, DOE/ID-10772, Rev. 1, U.S. Department of Energy Idaho Operations Office, September 2003.

Appendix A

Inspection Report Forms

INSPECTION REPORT FORM

SURFACE-SEALED TANK FARM INTERIM ACTION AREAS

AS REQUIRED BY THE GROUP 1 TANK FARM INTERIM ACTION OPERATION AND MAINTENANCE PLAN

Inspection activity	Inspector Signature	Inspection Date*	Comments/Recommended Repair
1. Inspect asphalt for cracks and potholes			
2. Radiological survey of asphalted areas			
3. Drainpipe filters			

*Inspections inside the tank farm fence are performed monthly for the first 6 months following installation and quarterly thereafter. Inspections outside the tank farm fence are performed quarterly following installation.

Name of inspector _____

Qualification/title _____

Photographs taken Yes No

NOTE: *Drainpipe filters must be replaced as per manufacturer's recommendation. Ensure filters are not obstructed by debris and are properly placed at each drainpipe. Cracks or potholes determined to pose a threat to the integrity of the impermeable barrier are to be noted by the individual performing the inspection and repaired as soon as practical.*

INSPECTION REPORT FORM

STORM WATER COLLECTION SYSTEM

AS REQUIRED BY THE GROUP 1 TANK FARM INTERIM ACTION OPERATION AND MAINTENANCE PLAN

Inspection Activity	Inspector Signature	Inspection Date*	Comments/Recommended Repair
1. Inspect for debris, ice, or other blockage			
2. Inspect for cracks/holes in concrete			
3. Inspect for standing water in ditches, culverts, and drainage areas			
4. Ensure facility inspections of lift station have been completed. Attach copy of Facility Inspection Report Form			
5. Radiological survey of outlets of drainage pipes and storm water collection ditches			

*Inspections are performed semiannually (April and October).

Name of inspector_____

Qualification/title_____

Photographs taken ___Yes ___No

INSPECTION REPORT FORM
EVAPORATION POND LINER AND PERIMETER
AS REQUIRED BY THE GROUP 1 TANK FARM INTERIM ACTION OPERATION AND MAINTENANCE PLAN

Inspection Activity	Inspector Signature	Inspection Date*	Comments/Recommended Repair
1. Inspect liner for rips/tears/environment degradation			
2. Inspect liner for animal intrusion			
3. Inspect liner for vegetation growth			
4. Inspect liner anchoring integrity			
5. Inspect fence for holes, wear, etc.			
6. Inspect pond inlet and outlets for debris and sediment			

*Inspections are performed monthly.

Name of inspector _____

Qualification/title _____

Photographs taken ____ Yes ____ No

INSPECTION REPORT FORM
EVAPORATION POND LEAK DETECTION SYSTEM
AS REQUIRED BY THE GROUP 1 TANK FARM INTERIM ACTION OPERATION AND MAINTENANCE PLAN

Inspection Activity	Data	Inspector Signature	Inspection Date*	Comments/Recommended Repair
1. Pump operations				
2. Water level				
3. Water surface area estimate (A)				
4. Day 1 totalizer volume (V1)				
5. Day 2 totalizer volume (V2)				
6. Leak rate = $V2 - V1 / A$				

*Inspections are performed monthly for the first 6 months and quarterly thereafter unless conditions warrant more frequent inspections.

Name of inspector _____

Qualification/title _____

Photographs taken ___ Yes ___ No

Appendix B

Manufacturers' Operation and Maintenance Information

Appendix B

Manufacturers' Operation and Maintenance Information

[Operations and maintenance information from all suppliers of equipment and materials used in the TFIA will be placed here in a future revision.]

